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53. The method of claim 52 including:
repeating instances of the auxiliary data throughout the source data, and with each
instance, varying the transformation.--

REMARKS

A clean copy of the pending claims is attached to the end of this document.

Applicant has amended the related application data to make a priority claim to U.S.
Patent Applications 08/215,289 and 08/154,866 filed March 17, 1994 and November 18, 1993,
respectively. In addition, applicant has submitted new claims.

Respectfully submitted,

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PENDING CLAIMS

1. A method of decoding an auxiliary code embedded in an audio signal, the method comprising:
performing statistical decoding of a multibit auxiliary code embedded in an audio signal, where the auxiliary code has been repetitively embedded in the audio signal;
decoding code values of the auxiliary code from two or more different portions of the audio signal, each having the multibit auxiliary code;
using the code values decoded from the two or more different portions of the audio signal to determine statistically the code values of the auxiliary code.
2. The method of claim 1 wherein bit values for code bits are decoded from each portion, and values decoded for the same code bits from different portions are used to statistically derive a bit value for each of the code bits.
3. The method of claim 1 wherein a statistical feature of the audio signal is analyzed to decode the code values of the auxiliary code.
4. The method of claim 3 wherein the statistical feature of the audio signal comprises entropy.
5. The method of claim 3 wherein the statistical feature of the audio signal comprises power.
6. The method of claim 1 wherein the auxiliary code is embedded in a digitized form of the audio signal by changing sample values of the digitized audio signal in the time domain.
7. The method of claim 6 wherein signal scaling with which the auxiliary code is embedded in the audio signal varies depending on sample values of the digitized audio signal.

8. The method of claim 1 wherein the auxiliary code is recoverable from a portion of the audio signal, and confidence with which the auxiliary code is accurately recovered increases with the number of different audio portions from which the auxiliary code is decoded.

9. The method of claim 1 wherein the auxiliary code comprises a code that enables or disables recording capabilities.

10. The method of claim 1 wherein the auxiliary code comprises a copyright identification code.

11. The method of claim 1 wherein the auxiliary code comprises a code used to monitor a broadcast of the audio signal.

12. The method of claim 1 wherein the auxiliary code comprises a code that triggers transmission of information about the audio signal from a decoding device to a service provider.

13. The method of claim 1 wherein the auxiliary code is used to generate a report about use of the audio signal.

14. A computer readable medium on which is stored software for performing the method of claim 1.

15. A method of decoding an auxiliary code embedded in an audio signal, the method comprising:

receiving an audio signal suspected of being embedded with an auxiliary code;
evaluating a statistical feature of a portion of the audio signal to decode code values of the auxiliary code from the audio signal; and
determining a code value in the auxiliary code based on the statistical feature.

16. The method of claim 15 wherein the statistical feature comprises power of the audio signal.

17. The method of claim 15 wherein the statistical feature is analyzed over different portions of the audio signal to decode two or more values of the auxiliary code.

18. The method of claim 17 wherein each of the two or more code values are decoded from corresponding time domain portion of the audio signal, and the statistical feature for each code value is evaluated over the corresponding time domain portion.

19. The method of claim 15 wherein the auxiliary code signal is repeated in different time domain portions of the audio signal.

20. The method of claim 19 wherein results of analyzing the statistical feature over the time domain portions in which the auxiliary code signal is repeated are used to recover the auxiliary code.

21. The method of claim 15 wherein the auxiliary code comprises a code that enables or disables recording capabilities.

22. The method of claim 15 wherein the auxiliary code comprises a copyright identification code.

23. The method of claim 15 wherein the auxiliary code comprises a code used to monitor a broadcast of the audio signal.

24. The method of claim 15 wherein the auxiliary code comprises a code that triggers transmission of information about the audio signal from a decoding device to a service provider.

25. The method of claim 15 wherein the auxiliary code is used to generate a report about use of the audio signal.

26. A computer readable medium on which is stored software for performing the method of claim 15.

--27. A method of steganographically encoding a set of source data with a set of auxiliary data, each of said sets of data comprising a plurality of elements, the method including:

(a) providing a carrier signal;

(b) processing elements of the carrier signal in accordance with a corresponding element of the set of auxiliary data to produce a processed datum, including scaling the processed datum as a function of the source data in a perceptual domain in which the source data is perceived by humans so as to make the processed datum adaptive to the source data in the perceptual domain;

(c) combining the processed datum with elements of said set of source data to produce an encoded datum, said combining including performing an addition operation between the processed data and said elements of source data;

(d) repeating steps (b) and (c) for other elements of the sets of auxiliary data and source data, thereby producing a set of encoded data.

28. The method of claim 27 wherein the processed datum is a non linear function of the source data to which the processed datum is combined in the perceptual domain.

29. The method of claim 27 wherein the source data is an audio signal.

30. The method of claim 27 including modulating a statistical characteristic of samples of the source data such that the resulting encoded source data has a statistical characteristic corresponding to a value of the auxiliary data element being encoded, and the auxiliary data element is decodable by measuring the statistical characteristic for elements of the encoded source data.

31. The method of claim 30 wherein the auxiliary data elements are decodable by performing a statistical analysis to determine a value of the statistical characteristic of a set of samples of the encoded source data, and based on the value of the statistical characteristic, determining a value of the encoded auxiliary data element.

32. The method of claim 30 includes modulating a statistical characteristic of time domain samples of an audio signal by adding the processed datum with the source data in a time domain.

33. The method of claim 27 wherein the auxiliary data comprises a binary code, and elements of the binary code are redundantly encoded in elements of the source signal such that the binary elements are decodable from portions of the source signal.

34. The method of claim 33 wherein elements of the binary code are spread over non overlapping portions of the encoded source signal.

35. The method of claim 34 wherein the binary code is recoverable from non-overlapping portions of the encoded source signal.

36. The method of claim 27 including modulating statistical characteristics of time domain samples of the source signal such that the auxiliary data is decoded by computing the statistical characteristics of the samples of the encoded source signal.

37. The method of claim 36 wherein the statistical characteristics are modulated by adding the carrier signal that has been modulated with the auxiliary data.

38. The method of claim 27 wherein instances of the auxiliary data is repeated in the encoded source data such that there is border continuity among the instances of the auxiliary data.

39. The method of claim 27 including concentrating the processed data at a frequency range so that the auxiliary data in the encoded source signal is likely to survive losses due to compression of the encoded source signal.

40. The method of claim 39 wherein concentrating the processed data includes filtering the carrier signal to the frequency range.

41. The method of claim 27 wherein the auxiliary data includes a copy control code.

42. The method of claim 41 wherein the copy control code is operable to disable or enable recording capability of audio or video instrumentation.

43. The method of claim 41 wherein the auxiliary data includes a multi-bit identification code that identifies the encoded source signal.

44. A computer readable medium on which is stored instructions for performing the method of claim 27.

45. A steganographic decoder operable to decoded the encoded source data which has been encoded according to the method of claim 27.

46. A method of steganographically encoding a set of source data with a set of auxiliary data, each of said sets of data comprising a plurality of elements, the method including:

providing a carrier signal;

processing elements of the carrier signal in accordance with corresponding elements of the set of auxiliary data to produce processed data sets;

combining the processed data sets with elements of said set of source data to produce encoded source data, including modulating a statistical characteristic of samples of the source data such that the resulting encoded source data has a statistical characteristic corresponding to a

value of the auxiliary data element being encoded, and the auxiliary data element is decodable by measuring the statistical characteristic for elements of the encoded source data.

47. The method of claim 46 wherein the auxiliary data elements are decodable by performing a statistical analysis to determine a value of the statistical characteristic of a set of samples of the encoded source data, and based on the value of the statistical characteristic, determining a value of the encoded auxiliary data element.

48. The method of claim 46 includes modulating a statistical characteristic of time domain samples of an audio signal by adding the processed data sets with the source data in a time domain.

49. A computer readable medium on which is stored instructions for performing the method of claim 46.

50. A steganographic decoder operable to decoded the encoded source data which has been encoded according to the method of claim 46.

51. The method of claim 46 including:
repeating instances of the auxiliary data throughout the source data, and with each instance, varying the carrier signal.

52. A method of steganographically encoding a set of source data with a set of auxiliary data, each of said sets of data comprising a plurality of elements, the method including:

providing a transformation between auxiliary data elements and a code signal;
processing elements of the auxiliary data in accordance with the transformation to produce processed data sets;

combining the processed data sets with elements of said set of source data to produce encoded source data, including modulating a statistical characteristic of samples of the source data such that the resulting encoded source data has a statistical characteristic corresponding to a

value of the auxiliary data element being encoded, and the auxiliary data element is decodable by measuring the statistical characteristic for elements of the encoded source data.

53. The method of claim 52 including:

repeating instances of the auxiliary data throughout the source data, and with each instance, varying the transformation.--